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Shallow water foraging using a shoreline boundary by the Indo-Pacific Humpback Dolphin *Sousa chinensis* in northern Australia

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Abstract

Observations of two specialised feeding behaviours (strand-feeding and repetitive tail-slapping) by the Indo-Pacific Humpback Dolphin *Sousa chinensis* during one feeding event in northern Australia are reported for the first time. These observations provide insights into the type of foraging habitats and niches of this shy coast dwelling species. The feeding behaviours are compared with similar behaviours of other toothed whales and dolphins.

Introduction

Several species of Odontocetes (toothed whales and dolphins) are known to feed in shallow water using a variety of behaviours (Hoese 1971; Lopez & Lopez 1985; Peddemors & Thompson,1994; Guinet & Bouvier 1995; Wells *et al.* 1999). For coastal dolphin species, the shoreline boundary and shallow water can limit prey escape and reduce the need for large hunting groups and fast pursuits (Wells *et al.* 1999). Given the numerous species of Odontocetes throughout the world, the variety of prey types and the vast range of shallow water habitats utilised, there is a surprisingly limited range of feeding behaviours described in the literature.

This note reports three shallow water foraging behaviours (milling, strand-feeding and modified tail-slapping) (Connor *et al.* 2000; Mann & Sargeant 2003) used by the Indo-Pacific Humback Dolphin *Sousa chinensis* during one foraging event in northern Australia. These observations highlight the diversity of foraging behaviours used by this species, which is known to inhabit turbid coastal and estuary waters.

Observations

On 1st May 2007, while standing on the shore of Cape Van Diemen at Melville Island, Northern Territory (11°10'39"S, 130°22'22"E), I observed five *Sousa chinensis* close to the western shoreline, a location which is sheltered from prevailing winds. Sighting conditions were good, sea conditions and the sea state was calm (Beaufort 0), and the water was relatively turbid. The observations were recorded one hour after low tide between 1030 h and 1050 h.

Initially, all individuals were observed between 5 m and 15 m offshore, in water estimated to range in depth from 0.7 m to 2.0 m and displayed behaviour consistent with common fish chasing milling behaviour (Mann & Sargeant 2003; Para 2006). This behaviour involves individuals taking slow dives, then re-surfacing, followed by short bursts of speed and with all forays beginning and ending in different directions.

After approximately five minutes of observation, two individuals on five occasions charged aggressively towards the shoreline, producing bow waves approximately 10 – 20 cm high. The dolphins did not swim together, but swam towards the shore in succession. Just before they reached the shore, they orientated themselves parallel to the shoreline creating a wave to wash up the sandy beach (Figure 1). On two of these occasions the dolphins were left partially stranded with more than half their bodies exposed. On these occasions, the individuals arched their bodies and angled their heads towards the shore presumably to search for beached prey. On the three other occasions the individuals swam into shallow water that restricted their ability to swim away easily. There did not appear to be any fish forced out of the water during any of these episodes.

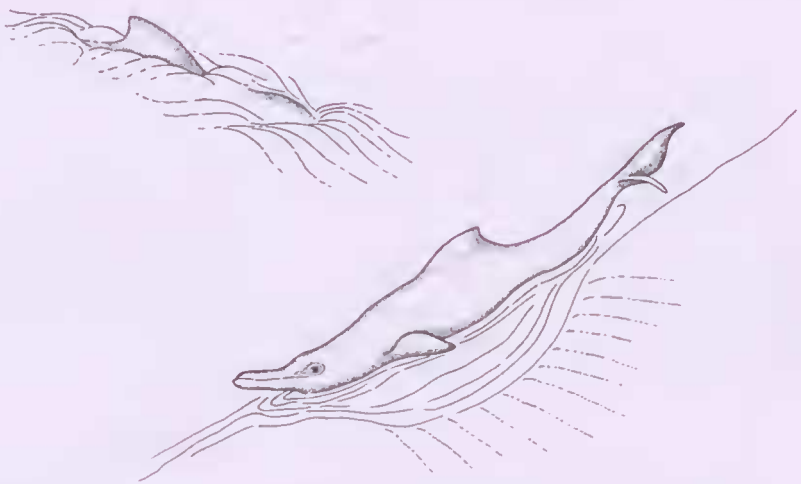

Figure 1. Indo-Pacific Humback Dolphin exhibiting strand-feeding behaviour.

In contrast, a third dolphin displayed different behaviour; it swam slowly and perpendicular towards the shore and repeatedly raised its tail fluke out of the water and slapped it back on the surface of the water in quick succession, making an audible sound and surface splash (Figure 2). On one occasion five tail slaps were used in succession before the dolphin u-turned away from shore. The dorsal fin remained out of the water between all five tail-slaps. All dolphins seemed unaware of, or oblivious to, my presence.

Figure 2. Indo-Pacific Humback Dolphin tail-slapping behaviour.

Discussion

The three foraging behaviours reported here include: (1) milling, (2) beach or strand-feeding and (3) tail-slapping. Milling behaviour is characterised by irregular surface intervals and individuals continually change direction with each dive and breath (Mann & Sargeant 2003; Para 2006). Beach or strand-feeding and tail-slapping have not previously been reported for this species (Para 2006).

The observed strand-feeding behaviour is similar to that described by Mann and Sargeant (2003) where bottlenose dolphins chase fish in shallow water and launch fully or partially out of the water to catch the fish. Strand-feeding has been recorded for *Sousa plumbea* in Mozambique whereby dolphins cooperatively or individually chase

fish out of the water, onto mud banks and then beach themselves to capture the prey (Peddemors & Thompson 1994). Interestingly, the geographical ranges of *Sousa plumbea* and *S. chinensis* do not overlap and high genetic divergence occurs between the African populations of *S. plumbea* and the Australian populations of *S. chinensis* (Frère *et al.* 2008). This shallow water foraging behaviour has also been recorded for common bottlenose dolphins *Tursiops truncatus* in Georgia (Hoese 1971) and South Carolina (Rigley 1983) and bottlenose dolphins *Tursiops* sp. in Western Australia (Sargeant *et al.* 2005). However, *S. chinensis* at Cape Van Diemen did not display the full exposed beaching and capture of beached fish described by Sargeant *et al.* (2005). It is interesting that similar strand feeding behaviour has been recorded among the genera *Orcinus* (Guinet & Bouvier 1995), Sousa (Peddemors & Thompson, 1994) and *Tursiops* (Hoese 1971; Rigley, 1983).

The tail-slapping behaviour observed at Cape Van Diemen differed from other tail-slapping behaviours such as the kerplunking behaviour described for bottlenose dolphins *Tursiops aduncus* in Western Australia (Connor *et al.* 2000; Nowacek 2002). Kerplunking is a specialised behaviour that involves the body being almost vertical with the tail held fully out of the water and then pivoting before the tail is brought down on the surface of the water. During each tail-slap the tail is pushed down and forward into the water producing a cloud of bubbles that possibly aid in scaring or detecting fish in bottom grubbing or played a role a social function (Connor *et al.* 2000). The tail-slapping behaviour of *S. chinensis* at Cape Van Diemen is dissimilar to the percussion kerplunking recorded in Western Australia (Conner *et al.* 2000), but may be used for the same purpose of herding or scaring fish similar to the behaviour used by bottlenose dolphins in Florida (Hamilton & Nishimoto 1977). The sequential surface tail-slapping behaviour recorded at Cape Van Diemen is not listed as one of the foraging behaviours for *S. chinensis* (Nowacek 2002; Mann & Sargeant 2003; Karczmarski *et al.* 2000; Parra 2006). There was no evidence of fish-whacking to stun prey with the tail fluke that has been observed in bottlenose dolphins and common dolphins (Wells *et al.* 1999; Nowacek 2002; Neumann & Orams 2003). Both strand-feeding and tail-slapping behaviours would be appropriate to herd fish into the shallow water and against the shoreline boundary to increase prey density and catch efficiency as suggested by Heimlich-Boran (1988). These observations provide some insights into the range of foraging behaviours of this shy coastal dolphin.

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References

Connor R.C., Heithaus M.R., Berggren P. and Miksis J.L. (2000) "Kerplunking": surface fluke-splashes during shallow-water bottom foraging by bottlenose dolphins. *Marine Mammal Science* 16, 646-653.

Frère C.H., Hale P.T., Porter L., Cockcroft V.G. and Dalebout M.L. (2008) Phylogenetic analysis of mtDNA sequences suggests revision of humpback dolphin (*Sousa* spp.) taxonomy is needed. *Marine Freshwater Research* 59, 259-268.

Guinet C. and Bouvier J. (1995) Development of intentional stranding hunting techniques in killer whale (*Orcinus orca*) calves at Crozet Archipelago. *Canadian Journal of Zoology* 73, 27-33.

Hamilton P.D. and Nishimoto R.T. (1977) Dolphin predation on mullet. *Florida Scientist* 251-252.

Heimlich-Boran J.R. (1988) Behaviour ecology of killer whales (*Orcinus orca*) in the Pacific northwest. *Canadian Journal of Zoology* 66, 565-578.

Hoese H.D. (1971) Dolphin feeding out of water in a salt marsh. *Journal of Mammalogy* 52, 222-223.

Karczmarski L., Cockcroft V.G. and McLachlin A. (2000) Habitat use and preferences of Indo-Pacific humpback dolphins *Sousa chinensis* in Algoa Bay, South Africa. *Marine Mammal Science* 16, 6-79.

Lopez J.C. and Lopez D. (1985) Killer whales of Patogonia and their behavior on intentional stranding while hunting near shore. *Journal of Mammalogy* 66, 181-183.

Mann, J. and Sargeant B. (2003) Like mother like calf: the ontongeny of foraging traditions in the wild Indian Ocean bottlenose dolphins (*Tursiops* sp.). In *The Biology of Traditions: models and evidence* (eds D.M. Fragaszy and S. Perry), pp. 237-266. Cambridge, New York.

Neumann D.R. and Orams M. (2003) Feeding behaviour of short beaked common dolphins, *Delphinus delphis*, in New Zealand. *Aquatic Mammals* 29, 137-149.

Nowacek D.P. (2002) Sequential foraging behaviour of bottlenose dolphins, *Tursops truncatus*, in Sarasota Bay, Fl. *Behaviour* 139, 1125-1145.

Parra G.J. (2006) Resource partitioning in sympatric delphinids: space use and habitat preferences of Australian snubfin and Indo-Pacific humpback dolphins. *Journal of Animal Ecology* 75, 862-874.

Peddemors V.M. and Thompson G. (1994) Beaching behaviour during shallow water feeding by humpback dolphins *Sousa plumbea*. *Aquatic Mammals* 20, 65-67.

Rigley L. (1983) Dolphins feeding in a South Carolina salt marsh. *Whalewatcher* 1, 3-5.

Sargeant B. L., Mann J., Berggren P. and Krutzen M. (2005) Specialization and development of beach hunting, a rare foraging behaviour, by wild bottlenose dolphins (*Tursiops* sp.). *Canadian Journal of Zoology* 83,1400-1410.

Wells R.S., Boness D.J. and Rathbun G.B. (1999) Behavior. In *Biology of Marine Mammals* (eds J.E. Reynolds and S.A. Rommel), pp. 324-422. Melbourne University Press, Melbourne.

Indo-Pacific Humpback Dolphins (*Sousa chinensis*) in Shoal Bay, Darwin Harbour. Dates: October 2010 (above); October 2011 (below). (Carol Palmer)